

# NAIS 2.0

SINGAPORE NATIONAL AI STRATEGY

AI for the Public Good  
For Singapore and the World



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# Foreword

2023 is a landmark year for Artificial Intelligence (AI).

Recent advances, especially in Generative AI, have opened doors to new possibilities. The most powerful AI models provide human-like intelligence, or a close proxy of it, to do anything from clinical diagnoses to self-driving cars.

These advances have also precipitated many important conversations – about the potential of AI, its harms, and even on what it means to be human.

Singapore believes in the transformative potential of AI. Our second National AI Strategy, or NAIS 2.0, represents Singapore's commitment to realise the benefits of AI, and to create exciting new opportunities. It outlines our vision for Singapore to be a place where AI serves as a force for good, and where we harness AI to uplift and empower our people and businesses.

Singapore may be a small island state, but we have big dreams and plans. We will participate fully in AI research and deployment, to do things that were not possible before, and bring benefits to ourselves and others outside Singapore. Hence, our vision for NAIS 2.0 is to achieve AI for the Public Good, for Singapore and the World.

This report spells out how we will achieve our vision. It sets out our plans to build a thriving AI ecosystem; develop our workforce to take on new opportunities; provide enough infrastructural capacity to achieve our ambitions; and foster a trusted environment that protects users and facilitates innovation.

In the end, our plans are only as good as our collective ability to implement them. That's why we welcome all stakeholders and partners to join us in this shared endeavour. Let us work together to realise the full potential of AI in our lives.

**LAWRENCE WONG**

Deputy Prime Minister & Minister for Finance



# Introduction

Since the release of ChatGPT by OpenAI on 30 November 2022, Artificial Intelligence (AI)<sup>1</sup> has gone mainstream. Recent breakthroughs, particularly those in the realm of Generative AI, have resulted in AI proliferating quickly. AI is moving beyond its traditional, narrow approaches, towards more general, almost human-like characteristics. The ability of ChatGPT to draft, depict, translate, understand context, and provide seemingly meaningful responses to our questions, has captured the imagination of not just scientists and experts, but all of us. For governments, these developments have raised new and critical questions around the risks and responsibilities associated with the development and use of such a powerful technology, even as AI continues to reinforce and remind us of what it means to be human.

In Singapore, where the vast majority of our people already frequently interact with digital technologies to transact with the Government and businesses, and are also digitally engaged at work, AI has been both commonplace and an uncommon force.

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<sup>1</sup> AI refers to a set of capabilities through which computer systems can demonstrate human-like behaviour and complete tasks which typically require human intelligence. It is considered a general-purpose technology which can be applied across a wide range of sectors. Some of its varied applications include advanced web search, recommendation and decision systems, advanced problem-solving, understanding speech and natural language, perception (for applications like facial recognition, image labelling, or autonomous vehicles), and Generative AI tools (including Large Language Models) that can produce various types of content, including text, images, audio, and synthetic data.

Fundamentally, Singapore believes that:

► **AI can be a potent force for good, to uplift human potential:**

- AI is a technology that will **transform cognitive and physical tasks**. We expect its benefits to be immense, making today's jobs easier, while bringing within reach activities that were previously computationally impossible.
- This requires us to **steer AI for the Public Good**. We must harness AI in a sustainable way to create positive impact – for new opportunities, better jobs, and safer, more meaningful connections.

► **AI is strategically important. We must invest in it to:**

- **Unlock the next frontier of economic growth**. We must master AI to overcome our labour and productivity challenges. This requires investments in our people, enterprises, and digital infrastructure, so that we can create new jobs and participate in industries of the future.
- **Address risks from the potential abuse and mismanagement of AI**. These include the misuse of AI to amplify harms (e.g. scams, cyberattacks, and mis/disinformation) across society, especially toward vulnerable groups.

**Singapore is not starting from scratch.** Some earlier moves in AI include:

- ▶ **National AI Strategy.** In 2019, Singapore was one of the first countries to introduce a National AI Strategy. We embarked on National AI Projects in areas like Education, Healthcare, and Safety & Security, and invested in enablers to strengthen our ecosystem.
- ▶ **Dedicated investments in AI Research and Development (R&D).** We have committed more than S\$500 million through AI Singapore (AISG) under the Research, Innovation and Enterprise (RIE) 2020 and 2025 plans.
- ▶ **AI Governance.** Singapore launched the world's first Model AI Governance Framework in 2019. In 2022, we also launched AI Verify, an AI governance testing framework and software toolkit, and made it open source for developers in June 2023.

**These early investments have borne fruit.** We have:

- ▶ **Built strong foundations for our AI ecosystem.** Singapore is well-regarded, ranking among the top 10 in the world by several international metrics.<sup>2</sup> Over 80 active AI research faculty, 150 AI R&D and product teams, and 1,100 AI start-ups call Singapore home.
- ▶ **Harnessed AI to improve Singaporeans' lives.** Today, AI powers many public services, such as adaptive learning systems in our schools, and chronic health management systems in our hospitals. We also use AI to support immigration and customs clearance, and to detect and deter online scams.
- ▶ **Forged international partnerships.** Singapore is recognised as an active contributor to global AI discourse, spanning issues from innovation to governance. We advocate for the responsible and ethical use of AI. We are active participants in multi-stakeholder platforms such as the Global Partnership on AI (GPAI), the World Economic Forum (WEF) AI Governance Alliance, and most recently the United Nations (UN) High-Level Advisory Body on AI. Singapore's initiatives, like AI Verify, have been welcomed as pragmatic contributions to the growing body of work on AI governance.

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<sup>2</sup> For instance, Singapore ranks 1st in per capita terms in the Stanford Global AI Vibrancy Index (2021); 2nd in the Oxford Insights Government AI Index (2021); and 3rd in the Tortoise Media Global AI Index (2022).

**The recent breakthroughs in AI demand a renewed focus by Singapore to refine our national strategies for AI:**

- ▶ **Greater capabilities.** AI is now more powerful and accessible. We therefore need to work with producers and users of AI in a more concerted manner, because responsible development and deployment do not happen by chance.
- ▶ **Greater concerns.** There are growing concerns over the safety and security risks of AI, particularly Generative AI models. These range from fears over malicious attacks on AI models, to the current inscrutability of large language models (LLMs), which calls into question the validity, credibility, and legality of their output. Such concerns have garnered attention from many around the world.

**There are also new competitive realities around AI:**

- ▶ **Resources and talent for AI are scarce.** These are concentrated within a few companies and countries, intensifying economic competition, as well as geostrategic and resilience risks.
- ▶ **Other smaller countries are also moving quickly to attract AI investments and talent.** While acquisitions for AI may be costly, they can confer enduring value and deepen capabilities, if properly integrated within the ecosystem.

Against this backdrop, **Singapore aspires to be a pace-setter – a global leader in choice AI areas, that are economically impactful and serve the Public Good.**

**We will therefore make three shifts from our first National AI Strategy:**



**From Opportunity to Necessity.** People “must know” AI, not just see it as a “good to have”. We need both technical experts and savvy users to maximise AI’s potential for Singapore.



**From Local to Global.** Our people and businesses should operate with the ambition to be world-leading in AI. Singapore should be well-connected to global innovation networks, working with the best to overcome complex challenges surrounding AI today (e.g. energy, data, and ethics). Singapore must contribute to AI breakthroughs and products that the world values.



**From Projects to Systems.** For AI to have widespread and positive impact on our economy and society, Singapore has to move beyond flagship National AI Projects. We will take a systems approach, bringing together stakeholders within and outside Singapore to add to our resources, capabilities, and infrastructure, accelerate the exchange of ideas, and administer AI-enabled solutions at scale.

We believe that Singapore can and will succeed, given (a) our position as a trusted global partner and major business hub, (b) our pro-innovation and business-friendly operating environment, (c) our strong knowledge base and capable workforce, and (d) our successful track record in transforming our economy. We are a nation of industrious people, known for being reliable and trustworthy, and in whose hands AI may flourish.

**It is with these convictions that we set out Singapore's second National AI Strategy (NAIS 2.0)**, which will also drive the next bound of our Smart Nation journey. Working together with our international network of friends and partners, we shall use AI to be a force for good, generating new economic opportunities and improving societies everywhere.



# National AI Strategy 2.0

## Our Vision and Goals

Developed through extensive engagements, NAIS 2.0 starts with the conviction that we must do our utmost to harness **AI for the Public Good, for Singapore and the World**. Singapore will be a place where AI can:

- ▶ **Address the needs and challenges of our time.** For example, in areas of global importance such as population health and climate change.
- ▶ **Be the great equaliser.** We shall uplift and empower our people and businesses, equipping them with the capabilities and resources to thrive in an AI-enabled future.

NAIS 2.0 seeks to attain the **twin goals** of:



**Excellence.** We will selectively develop peaks of excellence in AI, to advance the field and maximise value creation.



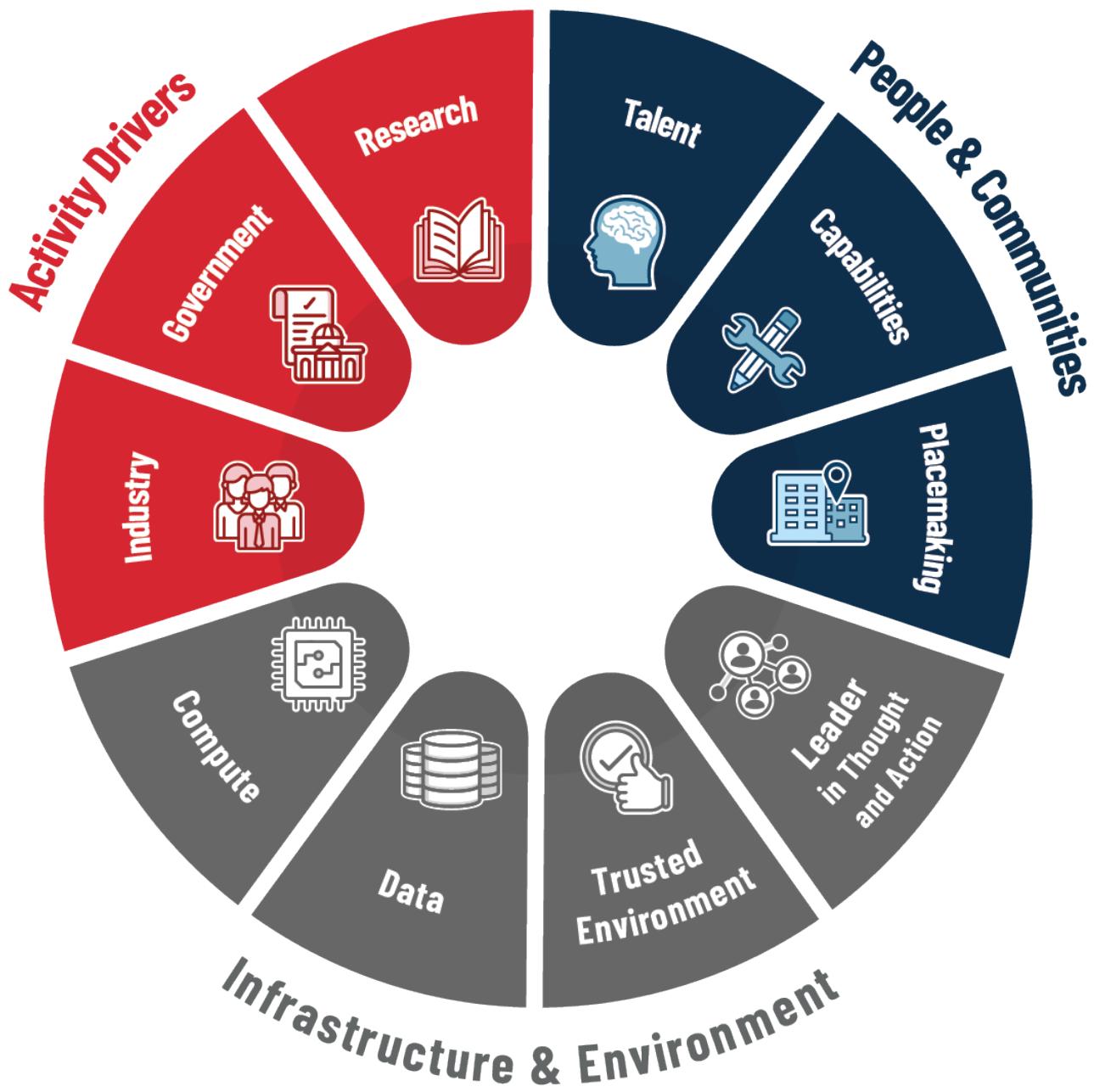
**Empowerment.** We will raise up individuals, businesses, and communities to use AI with confidence, discernment, and trust.

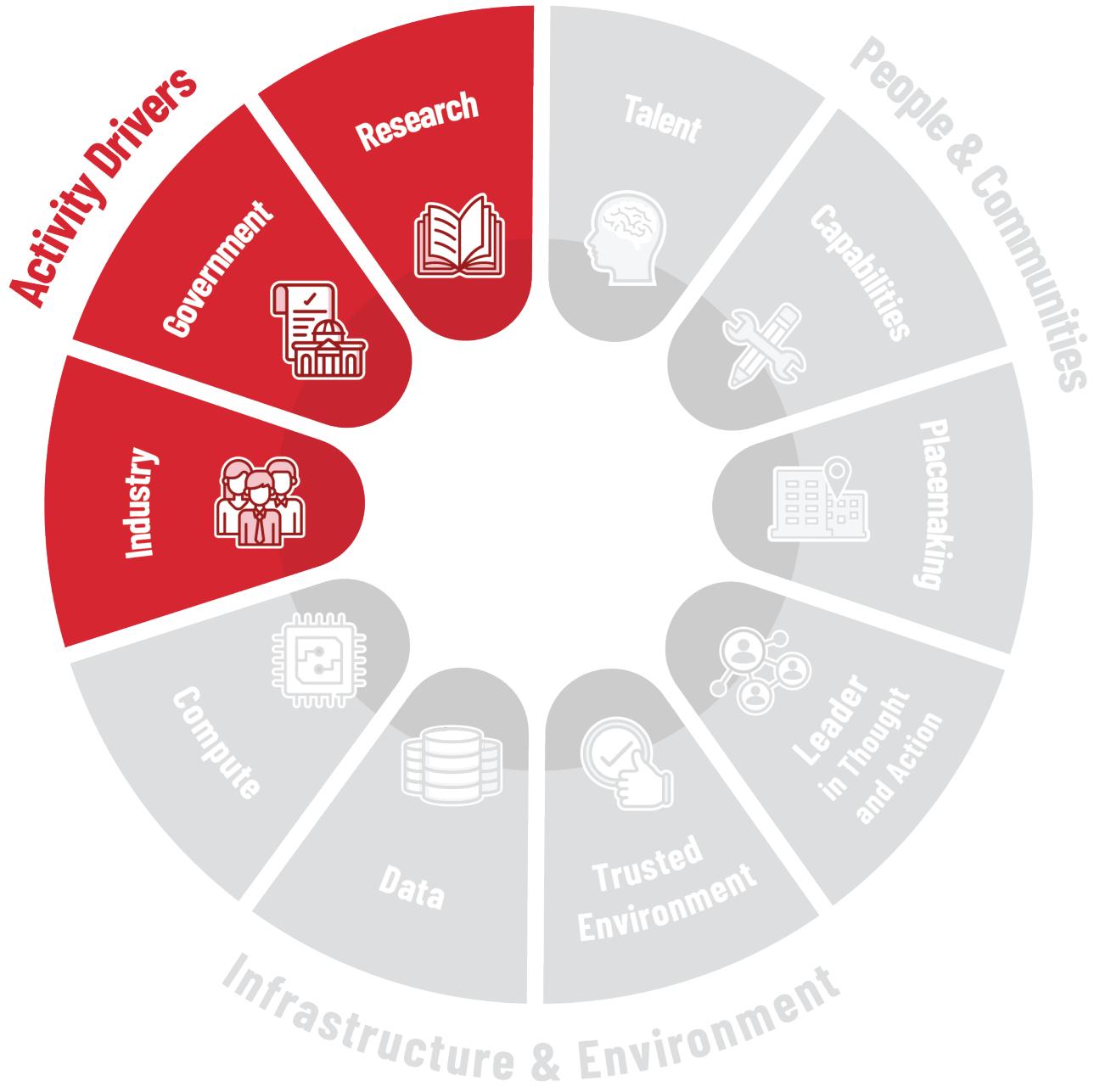
# Our Plans

To achieve our vision and goals, we will direct efforts under NAIS 2.0 toward **three Systems**, working through **10 Enablers**.

- ▶ **System 1: Activity Drivers (Enablers: Industry, Government, Research).** Industry, Government, and public research performers have deep technical capabilities that can be applied to deliver value. We need to orchestrate them around meaningful use cases and problem statements to transform our economy and society.
- ▶ **System 2: People & Communities (Enablers: Talent, Capabilities, Placemaking).** We will attract more top-tier researchers and engineers to work with and from Singapore. More of our technology workforce should work to scale novel AI solutions, that form part of the toolkit which a confident base of enterprises and workers can use.
- ▶ **System 3: Infrastructure & Environment (Enablers: Compute, Data, Trusted Environment, Leader in Thought and Action).** We will ensure that Singapore hosts the necessary infrastructure and provides a trusted environment for AI innovation. This will make us a credible leader and preferred site for AI development, deployment, and adoption.

This strategy statement outlines **15 Actions** that Singapore will undertake across these systems and enablers, to support our ambitions over the next 3-5 years. We will continually review these Actions to respond to fast-moving developments in AI, across domains.





# SYSTEM 1

# Activity Drivers

Industry, Government, and Research drive AI activity, from basic science to product R&D and adoption. Together, they help Singapore leverage the rapid innovation cycles in AI for the economy and our society.

Singapore has built up a strong and promising base of AI capabilities, which we should harness to significantly uplift the broader ecosystem. We will encourage greater experimentation and collaboration, focusing on interesting and impactful challenges, to reap greater benefits from AI.

## Feature Story

### AI Trailblazers

In July 2023, the Ministry of Communications and Information (MCI), Digital Industry Singapore (DISG), Smart Nation and Digital Government Office (SNDGO), together with Google Cloud, launched AI Trailblazers. This rapid prototyping initiative was a world's first, giving businesses and government agencies free access to Google Cloud's AI toolsets for up to three months, with the aim of generating 100 Generative AI use cases in 100 days, across the private and public sectors.

By working with the best-in-class to provide an innovation sandbox for AI development, Singapore was not only able to spark more experimentation, but also gave many more business owners the confidence to invest further resources once they were able to see the potential of AI in delivering their business objectives.



**Mrs. Josephine Teo**, Minister for Communications and Information, at the launch event for the AI Trailblazers initiative at the Google Asia Pacific campus.

We shall steer AI toward developing **select peaks of excellence**, which can deliver outsized impact to Singapore and the lives of Singaporeans.

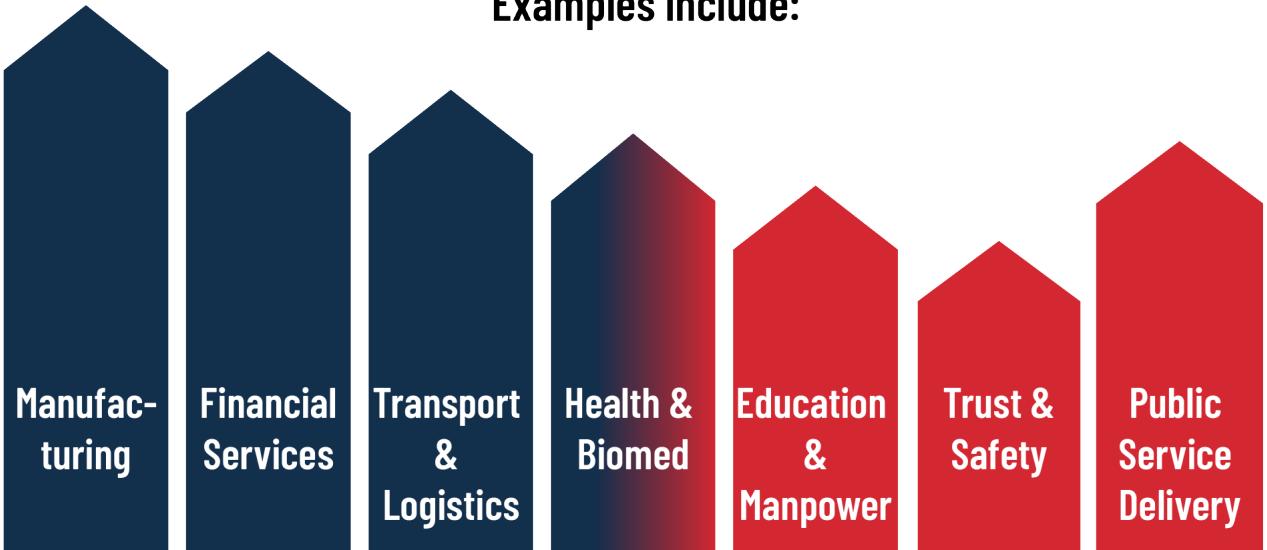
- ▶ **AI in Domains.** We will encourage AI innovation and adoption in key domains, including:
  - **Leading Economic Sectors**, which form a sizeable share of Singapore's real Gross Domestic Product (GDP) and for which AI innovation could catalyse the next bound of economic growth. Examples include Manufacturing, Financial Services, Transport & Logistics, and Biomedical Sciences.
  - **Smart Nation Priorities**, where AI assists our national development, and unlocks new value propositions for social impact. These include Healthcare, Education & Manpower, Trust & Safety, and Public Service Delivery.
- ▶ **Cross-cutting Capabilities.** We will invest in cross-cutting areas that can accelerate the development and deployment of AI solutions across all domains, including:
  - **AI for Business Operations**, where AI can optimise and transform business functions (e.g. customer relationship management, finance, human resources, legal, sales and marketing, and supply chain management).
  - **AI for Science**, where the use of AI can accelerate research productivity across scientific domains (e.g. drug discovery).
  - **Foundational AI**, where scientific advancements are still needed to improve AI's abilities. For a start, we will double down on three specific themes – **Reasoning AI**, **Resource-Efficient AI**, and **Responsible AI**<sup>3</sup> – with a view to making AI less costly, more widely-used, and most importantly, trusted.

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<sup>3</sup> **Reasoning AI** improves AI systems' ability to understand logical and physical concepts, and explain their output; **Resource-efficient AI** can help reduce AI's growing reliance on data and compute, while still ensuring performance gains; **Responsible AI** is critical to mitigate the risks of AI and ensure that AI is trustworthy, safe, and secure.

## Leading Economic Sectors Smart Nation Priorities

Examples include:



AI for Business Operations\*

AI for Science

Foundational AI: Reasoning, Resource-Efficient, Responsible

## Cross-cutting Capabilities

\* E.g. customer relationship management, finance, human resources, legal, sales and marketing, and supply chain.

# ENABLER 1

# Industry



Singapore's knowledge-intensive economy is especially exposed to AI. Our industries and enterprises need to be responsive, and ready to create AI-driven opportunities that will strengthen Singapore's economic competitiveness. This will help workers and industries set the pace and shape their own future, rather than face untimely disruption.

Many companies have already embarked on AI-enabled innovation projects, which are often focused on the Application layer. While these are useful and have made a difference, there is scope for us to go further. Deep and transformative AI innovation today increasingly requires integrated capabilities from across the entire technology stack (i.e. including Model and Infrastructure layers). There must also be a stronger nexus between sophisticated end-users and leading-edge AI innovators and producers.

To anchor transformative AI innovation and value creation in Singapore, the Government has a key role in curating the right incentives (e.g. targeted grants), resources (e.g. compute and talent), regulatory frameworks, and partners. For a start, we will adopt a sector-specific, use case-centric approach, and we will focus our initial efforts on **Leading Economic Sectors** assessed to be most ready for AI-driven transformation.

**Done well, we will have a thriving industry ecosystem in Singapore, with significant value creation from AI, and capabilities across the AI technology stack.** AI will complement our workforce, boost our productivity, and be a differentiating factor in attracting best-in-class companies to Singapore. We will also seed a virtuous cycle where industry end-users can tap into a dense network of AI producers, who in turn are motivated by the presence of strong, industry-relevant lead demand and product mandates.

## Action 1

### **Anchor new AI Centres of Excellence (CoEs) across companies, and explore establishing Sectoral AI CoEs to drive sophisticated AI value creation and usage in key sectors**

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**We will attract and anchor new AI CoEs in Singapore-based companies that are leading-edge producers (e.g. technology companies, start-ups) and sophisticated end-users, in order to conduct value creation activities across the AI stack.** These AI CoEs will (a) concentrate and deepen companies' innovation capabilities across the AI stack; (b) own core AI product charters and functions; and (c) align with the peaks of excellence that Singapore aims to build. Their roles could include creating new intellectual property, products, and services, beyond optimising business processes.

**In addition, we will explore establishing a new model of Sectoral AI CoEs to intensify sophisticated AI value creation and usage in selected economic sectors.** We will work with Industry Champions<sup>4</sup> to identify sector use cases and crowd in a broader base of researchers and companies in the sector.

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<sup>4</sup> Industry Champions refer to enterprise leaders that can form lead demand for AI solutions, boost their sector's competitiveness, uplift the capabilities of their supply chains, and generate spin-offs for the broader sector ecosystem.

**Feature Story****American Express Decision Science CoE**

In December 2022, American Express set up a Decision Science CoE in Singapore focusing on data science applications in the areas of credit and fraud risk model development using AI, Machine Learning (ML), and natural language processing (NLP). American Express expanded the CoE in November 2023 to also use AI and ML to optimise its customer marketing and service, and create personalised and relevant experiences across digital channels. The CoE will also create a Generative AI R&D practice focused on new AI applications for servicing, risk, and technology.



**Jacqueline Poh**, Managing Director, Economic Development Board (EDB) and **Anna Marrs**, Group President, Global Commercial Services and Credit & Fraud Risk, American Express at the official opening of the American Express Decision Science Center of Excellence.  
(Photo credit: American Express)

## Action 2

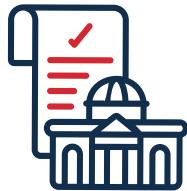
**Strengthen our AI start-up ecosystem, including attracting AI-focused accelerator programmes to spur rapid AI experimentation**

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In concert with private sector partners, we will strengthen the AI start-up ecosystem along several pillars. This includes attracting more venture builders and developing more accelerator programmes. We want to speed up AI value discovery across industry, and nurture a pipeline of disruptive, AI-native start-ups. These accelerator programmes could be led by a mix of big technology companies and venture capital firms. They will provide the capital, business and technical expertise, infrastructure, and market networks to spur rapid AI experimentation. We will nurture globally-oriented AI innovators to create intellectual property and scale to more markets.

## ENABLER 2

# Government



**The Government is committed to the continuous improvement of public service delivery for our people and businesses. We will harness AI to serve the public in more impactful ways.**

### Feature Story

#### OneService Chatbot



The Municipal Services Office and the Government Technology Agency (GovTech) launched the OneService chatbot to enable citizens to lodge complaints and provide information on them via commonly used social messaging apps (i.e. WhatsApp and Telegram).

Powered by AI, the chatbot can (a) automatically identify and classify complaints into the appropriate category (e.g. litter, illegal parking), (b) extract the relevant details of the incident that need attention, and (c) identify and inform the relevant Government agency to follow up on the case.

With this, citizens can easily provide municipal feedback without having to figure out which agency they should contact. Agencies can also attend to cases more quickly.

We also recognise the positive spin-offs from such efforts. These include providing lead demand for commercial AI tools, demonstrating AI-led transformation for the rest of the economy and society, spurring private sector investment in AI, and mainstreaming AI adoption.

For the Government to better harness AI, we need to:

- ▶ **Develop, deploy, and integrate more useful and powerful AI-enabled products.** These include customised or commercial off-the-shelf solutions. They can support the Government's needs, both general (e.g. smart transcription tools for citizen support services) and specialised (e.g. detecting anomalies in financial statements and transactions to assist anti-money laundering efforts).
- ▶ **Drive mass awareness and adoption of AI across the Public Service.** This will encourage public officers to use AI-enabled products and services confidently, for more efficient and effective public service delivery.
- ▶ **Work with industry and the public to better identify use cases and address pain points using AI.** This can be done through well-structured ideathons, hackathons, and incubator programmes.

#### Feature Story

#### Pair

##### Pair

Pair is a Large Language Model (LLM)-powered suite of tools for Government officers that allows the safe and secure use of LLMs within the Government's IT systems. Its base capabilities include ideation, drafting, text and natural language processing, coding, and data analysis, making it a versatile tool for various tasks that public officers commonly undertake.

Pair Chat is the first application to be developed within the suite. It functions on a question-and-answer format, powered by the same LLMs underlying ChatGPT. Thousands of public servants regularly access Pair Chat to increase their productivity at work.

## Action 3

### Improve Public Service productivity, with new value propositions for our citizens

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**The Government will accelerate public sector adoption of AI to unlock new value propositions for our people and businesses.** This will take place at two levels:

- ▶ **Smart Nation Priorities.** Government agencies equipped with the specialised knowledge, technical capabilities, and regulatory tools for these domains (e.g. Healthcare and Education) will develop and lead sector-specific AI strategies, to address the needs and challenges of these domains.
- ▶ **Whole-of-Government functional domains.** These include Finance, Human Resources, and Service Delivery, which are key to transforming government processes and services for the better. All Government agencies that lead such functions will identify and optimise specific business lines with AI, and build internal capabilities to deliver business outcomes.

**The Government will coordinate the resources needed to support public sector AI adoption.** For example, through **central funding** to support or scale-up novel and impactful use cases, facilitating **cross-agency data sharing**, providing **access to high-performance compute** and associated engineering capabilities (e.g. through AI Trailblazers), and issuing **facilitative policy guidelines**.

**We will also uplift the AI literacy baseline and sharpen the AI proficiency of all public officers.** We will develop and roll out targeted courses to impart AI skills, for different public sector workforce segments (e.g. senior management, policy, and operational roles).

# ENABLER 3

# Research



**A strong community of scientists and researchers contributes to a vibrant AI ecosystem in Singapore.**

- ▶ **They add to our overall technical heft**, making us attractive to other top researchers, investors, and entrepreneurs, to create new value in AI. This can generate other economic spin-offs, such as the creation of well-paying jobs, start-up growth, and sophisticated venture capital investments.
- ▶ **Their research breakthroughs can also translate into commercial products**, which can be used by our companies and across government agencies to realise better outcomes.
- ▶ **Their presence helps secure an enduring competitive advantage in AI for Singapore**. Over the last few decades, innovators in Silicon Valley and other AI research hubs (e.g. Beijing, Boston, Montreal, Seattle, and Toronto) have led these places' technological prowess. Singapore will similarly need strong research credentials.

**Singapore will take a pragmatic yet bold approach to building up and sustaining our leadership in select areas of AI research.**

## Action 4

### **Update national AI R&D plans to sustain leadership in select research areas**

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**We intend to update our national AI R&D plans in five ways: Research Priorities, Industry-Academia Nexus, Talent, Compute, and International Collaborations.**

- ▶ **Research Priorities.** To optimise our limited resources for impact, we will be selective in our AI research priorities, and align them to the peaks of excellence that Singapore hopes to build.
- ▶ **Industry-Academia Nexus.** We will foster more R&D collaboration between academia and industry, capitalising on the growing porosity of talent and innovation activities across the two spheres.

## Feature Story

### AISG's 100 Experiments programme

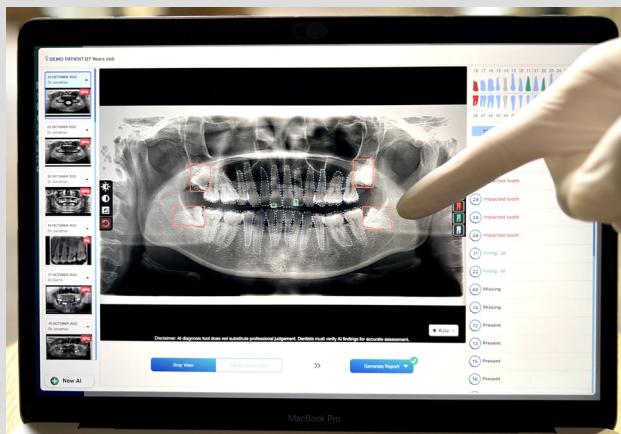
100 Experiments (100E) is AISG's flagship programme, aimed at solving AI problem statements proposed by industry where no commercial off-the-shelf AI solutions exist.

As part of this, AISG helps pair companies with public researchers to develop AI solutions that address the former's problem statement, and provides co-funding of up to S\$330,000 per project.

Several companies, from a range of sectors, have participated in the 100E programme.

One example is Q&M Dental Group's EM2AI, which worked with AISG to create an AI model that helps dentists review X-ray images to detect disease, present findings as dental charts, and recommend appropriate treatment plans. Q&M Dental Group has deployed this model across more than 150 clinics in Singapore and Malaysia.

Another example is Tencent's Lightspeed Studios, a globally-leading game developer that published games like PUBG Mobile. Under the project, Lightspeed Studios partnered AISG to develop a text-to-speech system to support the narration of game storylines, so that gamers who speak Malay can experience the games in their native language.



Through 100E, **Q&M Dental Group's EM2AI** has developed an AI model that helps dentists, and has deployed this across its clinics in Singapore and Malaysia.

(Photo credit: Q&M Dental Group)



Through 100E, **Lightspeed Studios** is partnering with **AISG** to develop a new text-to-speech system for gamers.

- ▶ **Talent.** We will strengthen efforts to recruit top AI researchers to work from and with Singapore (see Action 5).
- ▶ **Compute.** We will secure access, and operate Graphics Processing Units (GPUs) for Singapore's research community. This will also build up Singapore's infrastructure engineering expertise.
- ▶ **International Collaboration.** We will expand international research collaboration in areas aligned with our research priorities. This could take the form of joint grant calls or PhD training programmes with other countries, or involvement in international conferences. This will allow Singapore to level up our current capabilities by working with the best in the world and make a meaningful contribution to global AI development.

#### Feature Story

### Singapore-Republic of Korea Joint Grant Call for AI Research

In February 2023, AISG and the Republic of Korea (ROK)'s Institute for Information & Communication Technology Planning and Evaluation (IITP) launched a joint grant call to fund research on AI-based net-zero energy building management optimisation systems.

This grant call supported a research project between Nanyang Technological University and Korea University, to study AI-based energy management and optimisation frameworks, to enhance the energy efficiency of Heating, Ventilation, and Air Conditioning (HVAC) systems. The project also drew in industry partners from both countries.

**Feature Story**

## Singapore Conference on AI

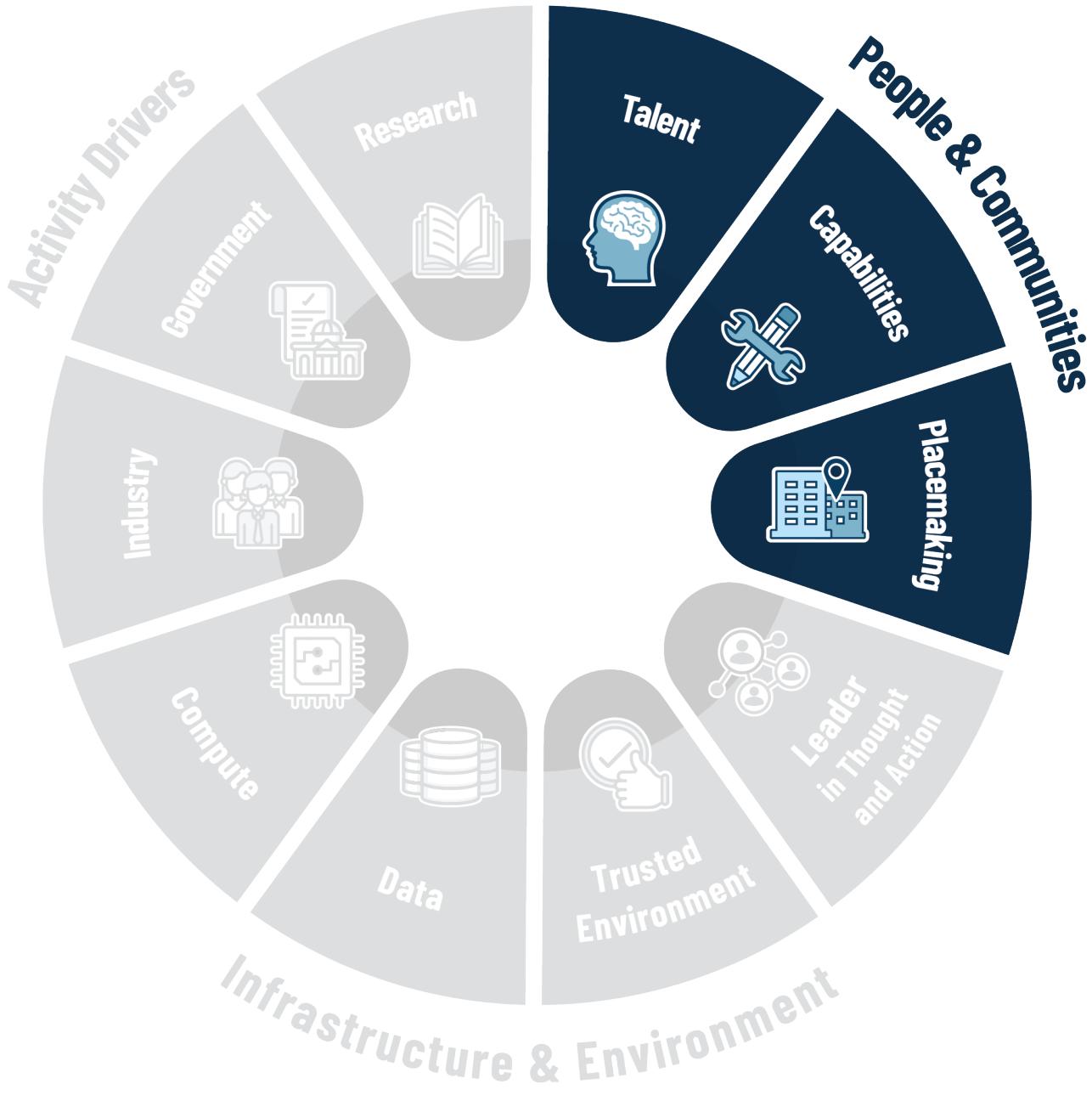
In December 2023, MCI and Smart Nation Group convened the inaugural Singapore Conference on AI (SCAI), to bring together a select group of top AI researchers to discuss and articulate the top research problems of AI research, development, and deployment that, if solved, would allow humans and society to flourish.



Over 40 local and overseas experts from academia, non-profit, industry and government gathered in Singapore for **SCAI**.



**SCAI** participants identifying a list of critical questions that need to be addressed to realise AI's full potential.



# SYSTEM 2

# People & Communities

**Tight-knit knowledge communities are critical for AI innovation**, driving the exchange of ideas and expertise for research, product development, and the impactful use of AI. Singapore must be home to exemplary AI Creators, Practitioners, and Users. We must:

- ▶ **Attract, anchor, and develop more AI Creators** (top-tier AI talent) from industry and academia to work with and from Singapore, to generate cutting-edge AI research and drive novel use cases.
- ▶ **Increase the number of AI Practitioners** (tech workers) with the skillsets to create, implement and deploy AI systems, models, and algorithms in organisations, at scale.
- ▶ **Build up a base of confident AI Users** (enterprises and general workforce) that are equipped to use AI-powered products and services to increase productivity, and pursue better jobs and more impactful work.
- ▶ **Accelerate the exchange of ideas**, both within our local AI community of Creators, Practitioners, and Users, and across global networks.

## ENABLER 4

# Talent



**Singapore will expand the pool and raise the quality of our AI Creators and Practitioners**, to accelerate AI innovation and support AI Activity Drivers.

- ▶ We must increase the number and diversity of AI Creators working from and with Singapore, to drive leading-edge R&D activities and product development.
- ▶ We must also boost our pipeline of AI Practitioners. They are critical to supporting top-tier AI activity, translating innovation into products and services, and transforming our industries.

## Action 5

### Attract world's top AI Creators to work from and with Singapore

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**Singapore will engage and attract world-class AI Creators**, from both the public research and industry spheres, to deepen their innovation activities here. We will:

- ▶ **Set up a dedicated team to identify, engage, and anchor AI Creators.** This team will be the primary interface to facilitate the integration of AI Creators into the Singapore ecosystem, including through bespoke support mechanisms.
- ▶ **Create novel value propositions to attract AI Creators.** We will intensify local AI development activities and induct international experts into our AI ecosystem to create the building blocks for success. We will explore possible modalities for doing so, such as hybrid Singapore-overseas working arrangements, part-time appointments across industry and academia, and partnerships with international research institutions or companies.

## Action 6

### Boost AI Practitioner pool to 15,000

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**Singapore will boost the pool of AI Practitioners to support growing AI demand,** by:

- ▶ **Scaling up AI-specific training programmes.** We will re-design the AI Apprenticeship Programme (AIAP)<sup>5</sup> to significantly increase the number of apprentices we can train annually. We will also work with industry AI product development teams to expand the number of company attachments for our Continuing Education and Training programmes.
- ▶ **Scaling up technology and AI talent pipelines,** through Pre-Employment Training and by reskilling and upskilling workers through Continuing Education and Training.
- ▶ **Remaining open to global tech talent.** We will continue to welcome global AI talent to work and live in Singapore, and contribute to our national efforts.

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<sup>5</sup> The AIAP is currently designed as a 9-month, full-time, deep-skilling company-led training programme, that helps trainees acquire AI capabilities by working alongside industry teams on real business problems.

**Feature Story****TechSkills Accelerator**

Driven by IMDA, in collaboration with industry, SkillsFuture Singapore (SSG), Workforce Singapore (WSG), and the National Trades Union Congress (NTUC), the TechSkills Accelerator (TeSA) aims to build and develop a skilled Information and Communications Technology workforce, which includes AI talent. Through Company-Led Training Programmes and Career Conversion Programmes, amongst others, TeSA has partnered industry to train individuals in AI and Data Analytics, with more than 2,700 individuals placed in good jobs thus far.

## ENABLER 5

# Capabilities



**It is important to uplift the AI capabilities of our industries and workforce**, to enable our enterprises and workers to reap the benefits of AI, and minimise its disruptive effects.

- ▶ **AI has the potential to help enterprises increase their productivity and stay relevant**, provided they have the capabilities to apply it well.
- ▶ **Workers must also be equipped with the necessary skillsets to utilise AI tools**, so that they can increase their productivity, avoid untimely disruptions to their jobs, and help enterprises optimise their operations and improve their competitiveness.

**While all economies must prepare for AI disruptions, we believe that Singapore is well-placed to navigate them.** Singaporeans have persistently demonstrated resilience and adaptability in the face of change, and the Government has a strong track record of managing such nation-wide transitions, whether structural or cyclical, through our policies and outreach. We will build upon our existing toolkits, schemes, and training programmes, to empower enterprises and workers to adopt AI and stay ahead of the curve.

## Action 7

### Intensify enterprise AI adoption for industry transformation

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**Singapore will intensify the promotion of AI adoption across all enterprises.**

- ▶ **We have made available tools that enterprises can use to evaluate their readiness to adopt AI.** For example, self-assessment tools like AISG's AI Readiness Index (AIRI) are useful in helping companies identify and map out the capabilities and infrastructure they need for using AI.
- ▶ **We will promote baseline digital adoption for our enterprises and enhance the enterprise digitalisation toolkit, to support more sophisticated AI adoption.** Businesses' first interactions with AI often happen through their existing enterprise solutions. Only after they have had the foundational capabilities in place, and are convinced of AI's benefits, do they then turn to more advanced or bespoke AI business solutions. Through programmes like SMEs Go Digital and CTO-as-a-Service (CTOaaS), the Government has helped businesses gain awareness of suitable AI-enabled solutions. We have also encouraged the adoption of sector-relevant AI solutions, through our refreshed Industry Digital Plans (IDPs).
- ▶ **For more digitally mature enterprises, we will provide tailored support for AI-enabled business transformation.** This includes leveraging IMDA and EnterpriseSG's Digital Leaders Programme (DLP), which helps companies build in-house digital capabilities, as well as the scoping of impactful AI projects in partnership with AI solution providers.

## Action 8

### Upskill workforce through sector-specific AI training programmes

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**To help workers acquire the necessary skillsets to work with AI, Industry Transformation Map (ITM)<sup>6</sup> Sector Leads will develop targeted interventions for their sectoral workforce.** AI has multiple applications in different contexts, and ITM Sector Leads are best placed to size the potential impact of AI on their respective industries, and by extension their workforce. Sector Leads can ride on existing frameworks like the Jobs Transformation Maps (JTM)s to identify the relevant skillsets needed, and develop appropriate training programmes for AI upskilling and reskilling.

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<sup>6</sup> ITMs are roadmaps developed for 23 industries under six clusters to systematically raise productivity, develop skills, drive innovation, and promote internationalisation, so as to catalyse transformation. ITMs will be refined over time to ensure relevance.

**Feature Story**

## Jobs Transformation Maps

JTMs provide detailed insights on the impact of technology and automation on sectors and their workforce. They identify key technologies that are driving change, and their impact on individual job roles. As existing job roles evolve and new job roles emerge, JTMs also identify the pathways for employers to transform jobs and for workers to acquire requisite skills. JTMs serve as a useful compass for employers and workers to prepare themselves for the future of work as technology becomes more pervasive in their sectors.

One example is the Financial Services JTM, which studied the impact of AI, advanced analytics, and automation on jobs and skills in the Financial Services sector in 2019. The JTM helped prioritise the industry's efforts to reskill and redeploy employees in segments that were identified as likely to experience significant changes, such as consumer banking, insurance, and operations.

MAS and the Institute of Banking & Finance, with support from WSG, will be studying how Generative AI will transform the financial sector, including where Generative AI might be deployed, and by when. This will further inform our understanding of how Generative AI will impact jobs in the sector, and provide advice on how the workforce should upskill and reskill to perform new and augmented roles.

## ENABLER 6

# Placemaking



In a vibrant ecosystem, **diverse talent can readily connect with one another and forge meaningful partnerships**. There are many talented AI Creators and Practitioners today, with good ideas that can expand the frontier of AI. The opportunity to spar and collaborate with like-minded peers can enrich these ideas, and accelerate the translation into products and new value. Such synergies are seen in global AI hubs such as San Francisco, where stakeholders working across all parts of the AI ecosystem are found in close proximity, and the vibrancy of the community in turn attracts the participation of even more talented individuals, companies, and capital.

To realise similar benefits, **Singapore intends to provide more platforms which can bring our AI community together**. We want to engage with more of our talent pool, and connect them to global AI experts for greater opportunities to interact and collaborate. Over time, we hope these connections will create a sense of identity and fraternity, and build up a broader Singapore AI community that can attest to the support and inspiration that this network provides.

## Action 9

### **Establish an iconic AI site to co-locate AI creators and practitioners, and nurture the AI community in Singapore**

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**Singapore will establish a dedicated physical place for AI in Singapore.** This will be a focal point for our community of AI Creators and Practitioners to form new connections and spark new ideas:

- ▶ **This place will serve as an intellectual home for both Singapore-based individuals and visiting colleagues.** We will welcome entrepreneurs, researchers, engineers, apprentices, and students, who are passionate about AI and share our mission orientation, to this place. There, we will include a variety of purpose-built spaces aimed at building up a sense of community and accelerating the exchange of ideas. We will co-create this place in close consultation with AI ecosystem representatives.

## RAISE.SG

Singapore organised the inaugural RAISE.SG in July 2023, gathering 27 Singapore-linked AI Creators and Practitioners (from across academia, industry, and non-profit organisations, based locally and overseas), to discuss how Singapore could prepare and invest for the next bound of our AI journey.



The inaugural **RAISE.SG** gathered a diverse collection of Singapore-linked AI Creators and Practitioners, to exchange ideas on the next bound of Singapore's AI journey.



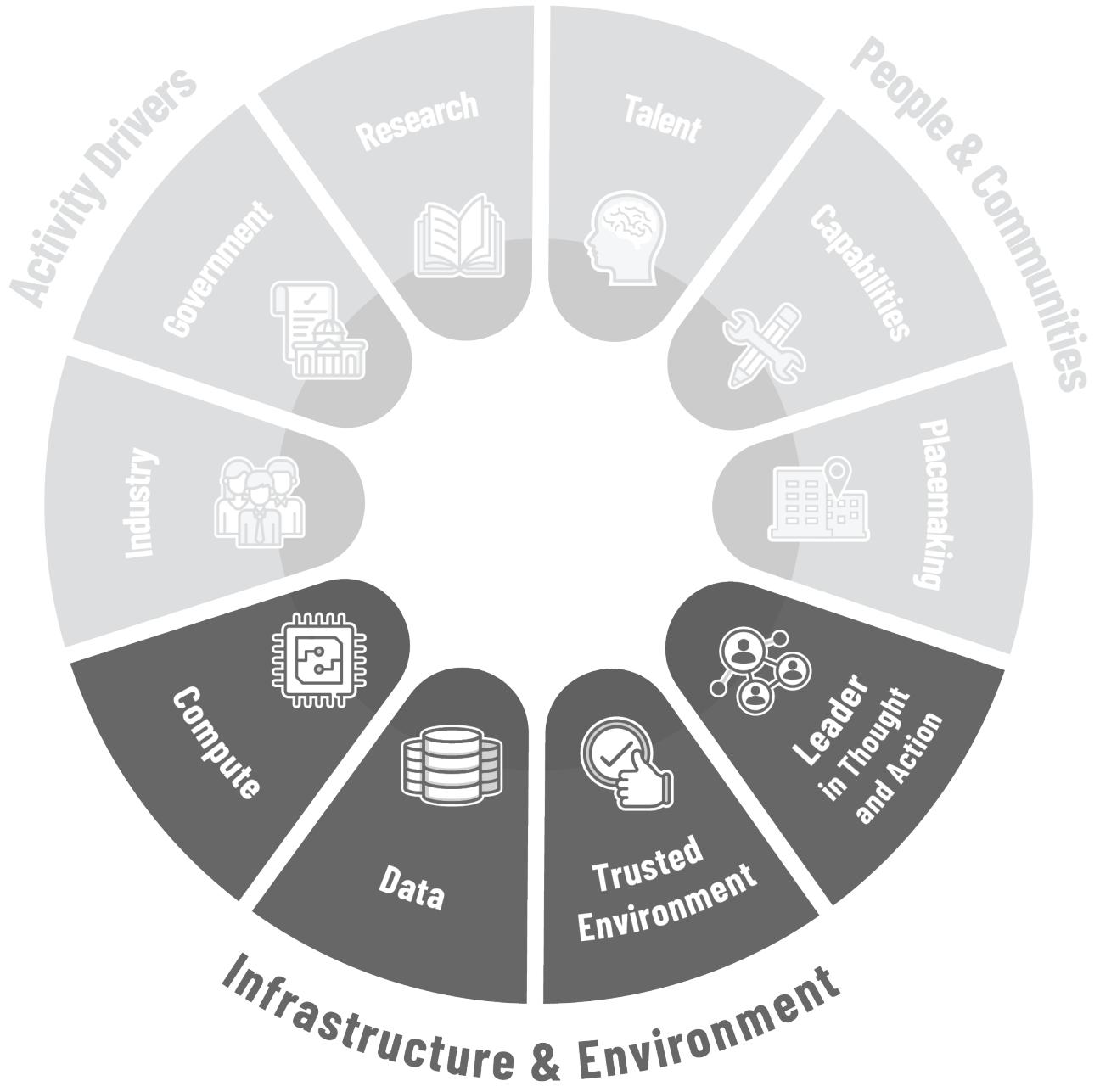
**RAISE.SG** participants also interacted with representatives from the local AI community, including through community-building events which drew in start-up founders, investors, and government agencies.

**Feature Story**

Participants emphasised the need to **nurture a strong, tight-knit AI community in Singapore**, concentrating community activities in a focal site to increase opportunities for interactions and the meaningful exchange of ideas. They suggested that this site be:

- ▶ **Supported by a full calendar of AI-related programming**, including community-run events such as hackathons, demo days, guest lectures, seminars, and social functions, which create opportunities to build relationships across the community.
- ▶ **Enhanced with a “digital community” layer**, to enable online collaborations and remote participation in community events by Singapore-linked AI talent who are not physically based in Singapore. Through such virtual interactions, the local AI community can connect more frequently, including with other AI innovation communities elsewhere.

The Government will explore such suggestions and other ways to support efforts that strengthen our AI community. For instance, we will work with industry and public research partners to organise more AI-related events, and increase the cadence of AI community networking events such as the ongoing Neural Networking series. Building on the inaugural RAISE.SG, we will organise regular gatherings of AI experts with a Singapore nexus, as well as arrange engagements with prominent foreign-based AI experts and practitioners who visit Singapore.



# SYSTEM 3

# Infrastructure & Environment

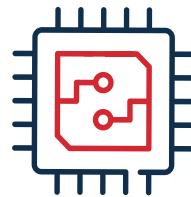
**Successful AI value creation requires robust and conducive infrastructure and a facilitative environment**, where all stages of the AI life cycle are well supported, and everything works the way it should.

For Singapore, this will involve:

- ▶ **Availing compute and data for AI innovation.** These are important building blocks to serve our AI ambitions.
- ▶ **A trusted environment where AI-enabled innovations and systems are robust and safe,** so that our people can engage with AI with confidence.
- ▶ **Safeguarding Singapore's AI interests in the international arena.** We hope to participate in shaping the international rules of the road that are emerging around AI.

## ENABLER 7

# Compute



**The increasing scale and proliferation of AI models have driven exponential growth in demand for chips that can support AI workloads (compute), such as GPUs.** However, GPUs are in short supply, and we face intense global competition to access them. In addition, the resource-intensive nature of AI workloads requires adequate and sustainable infrastructure capacity, which we have to prepare for.

**To support high value AI activities, Singapore must ensure reliable, localised access to high-performance compute,** so that industry, academia, and the Government have the means to innovate and build here.

- ▶ Careful management is needed, as this infrastructure will take up significant power, carbon, water, and land, all of which are limited in Singapore.
- ▶ While most of the compute supply is expected to go toward industry use, we will direct a small proportion towards meritorious use cases that build up our local research and industry capabilities, or are in service of the Public Good.

**We will also work with sustainability leaders in this space,** to help Singapore achieve our AI ambitions while meeting our sustainability goals.

## Action 10

### Significantly increase high-performance compute available in Singapore

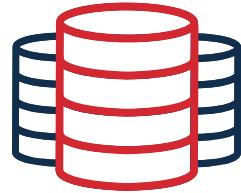
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We will actively crowd in a significant amount of compute to Singapore to support our growing AI needs, especially in areas of national interest. To this end, we will:

- ▶ **Deepen our substantive partnerships with major compute players**, ranging from chipmakers to Cloud Service Providers (CSPs), to secure local access to compute capacity.
  
- ▶ **Support Singapore-based compute with the required resource envelope.** We will ensure that there is sufficient carbon budget and power allocated to support data centres, that house GPUs or their equivalents, to process AI workloads in the near term. In the medium to longer term, we will chart a roadmap towards the growth of net-zero, green data centres that are powered by renewable energy. This includes continued collaborations with industry on innovative proposals to push the sustainability envelope.
  
- ▶ **Manage a small subset of Singapore-based GPUs or their equivalent**, to support meritorious use cases for capability building, innovation, and the Public Good.

## ENABLER 8

# Data



**AI activity is built upon confident, reliable access to high-quality, relevant datasets.** Data remains one of the essential factors of production for AI.

Today, there are more avenues for AI development to overcome the traditional obstacles of data availability and access. The open-source movement has made large quantities of data available, while private sector data marketplaces also facilitate the commercial trading of datasets. Meanwhile, it has become easier to create and augment structured datasets for AI, including through the use of synthetic data.

**National efforts to maximise value from data should therefore pivot away from access and availability, to address other emerging factors.** These include improving the quality of datasets, and ensuring that data use for AI development is context-appropriate and operates within trusted data sharing frameworks. We are also keen to make more government datasets available to solve AI problems of high national priority. **Done well, we will demonstrate to AI developers that Singapore is a conducive place for responsible AI development.**

- ▶ **We want to uncover and avail more good data that AI Activity Drivers can leverage.** While Singapore may not have the biggest datasets where size of population is the key determinant, the breadth and depth of our economic base suggest that meaningful datasets can still be mined to generate useful insights and derive new value.

- ▶ **Singapore should continue to lean forward to support industry efforts to employ data for AI.** Importantly, given increased concerns around data security, we should invest in Privacy-Enhancing Technologies (PETs), and other novel approaches that can address barriers around data protection and sharing, to encourage more data flows.
- ▶ **The Government should also support the data needs of meritorious use cases that serve the Public Good, particularly if these are aligned with our national priorities but are not commercially attractive.** This will ensure that such projects do not fall through the cracks.

## Action 11

### Build capabilities in data services and Privacy-Enhancing Technologies

**Singapore will build up our data management capabilities** so that more of us can store, manage, share, and govern the data that we have, enabling us to draw new insights and uncover more value. To do so, we will need to harness new technologies that will enable safe and trusted data sharing, and grow more capabilities to do so at scale.

- ▶ **We will develop capabilities in PETs.** PETs enable businesses to access other datasets in a privacy-preserving manner, hence extending the pool of data from which they can derive insights. The Government will support research and development for PETs, especially in targeted areas like synthetic data generation, data annotation, federated learning, and homomorphic encryption, and expand practical measures like regulatory sandboxes and guidelines to promote experimentation with PETs.

Feature Story

#### PET Sandbox

To facilitate industry experimentation with PETs, IMDA launched Singapore's first PET Sandbox in July 2022, to provide opportunities for companies to work with trusted PET solution providers to develop use cases and pilot PETs. This recognises that PETs are still in their infancy, and there is much to learn about using them in a real-world environment.

The PET Sandbox matchmakes use case owners to a panel of PET digital solution providers, provides grant support to user companies to scope and implement pilot projects, and provides regulatory support to ensure that the deployment of PETs meets compliance guidelines.

## Action 12

### Unlock Government data for use cases that serve the Public Good

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**Singapore will selectively unlock more public sector data for AI development that serves the Public Good.** We will assess the feasibility of setting up a “data concierge” within the Government, to engage AI Activity Drivers and Creators, and identify and facilitate access to the datasets that they require for their AI development activities.

- ▶ For **public sector** datasets, the data concierge will help AI Activity Drivers and Creators discover and obtain access to appropriate public sector datasets. Where these are not already open-access, the data concierge will help unlock closed datasets through brokering data sharing agreements. It could also work upstream with agencies to collect data based on the client’s needs. This will be underpinned by a data-sharing evaluation framework that takes the “Public Good” dimension into account.
- ▶ For **private sector** datasets, the Government can consider stepping in for selected high-value use cases where we can play a catalytic role. In such cases, the data concierge can explore facilitating handshakes between private industry entities as a trusted intermediary, to aggregate and produce data derivatives.

**We will continue our thought leadership around the progressive use of data for AI development,** such as advocating for trusted cross-border data flows and providing guidelines to businesses to educate and facilitate greater data use.

## ENABLER 9

# Trusted Environment



**Trust and safety underwrite confidence in Singapore's AI landscape.** They lie at the heart of our interventions to deliver AI for the Public Good.

- ▶ **We will endeavour for AI to be developed and deployed in a safe, trustworthy, and responsible manner.** The Government will institutionalise appropriate governance and security frameworks for AI systems. The ultimate aim is to establish a trusted environment for AI, where people can have the confidence that their interests are protected when interacting with AI.
- ▶ **We must retain agility in our regulatory approaches.** AI will continue to evolve, and no party has full sight of the risks that might emerge. It is only through experimentation and exploration that the AI community can deepen its understanding of AI, and discover and address potential risks. The Government must therefore take a pragmatic approach – supporting experimentation and innovation, while still ensuring that AI is developed and used responsibly, in line with the rule of law and the safeguards we have put in place. Where existing regulatory frameworks need to be updated, we will do so thoughtfully and in concert with others, accounting for the global nature of AI.

**There is a range of potential risks around AI**, spanning from concerns around model quality and fair use, to fears around the loss of control and existential risks. Singapore remains open to engaging with all perspectives, to enhance our understanding of the risk landscape and to inform our most urgent priorities for risk mitigation. For a start:

- ▶ **We must ensure that AI systems are well-developed, reliable, and resilient.** This requires paying close attention to the model development process, to ensure that the output of models is not biased, inaccurate, or erroneous. AI models should also be aligned with the appropriate set of human and cultural values. Existing international conversations around AI governance and safety are largely centred on these concerns.
- ▶ **We must prevent AI models from being used in malicious or harmful ways, and secure them against adversarial attacks.** If AI is used carelessly, it can potentially amplify negative outcomes like discrimination, anti-competitive behaviours, or intellectual property infringement. It can also be deliberately misused against us, to supercharge existing threats (e.g. scams, cyber-attacks, and mis/disinformation) in terms of scale, speed, and sophistication. We must remain vigilant against these risks to maintain digital trust.

**The Government will take differentiated approaches to managing risks to and from AI**, ranging from regulatory moves to voluntary guidelines, recognising that AI will continue to evolve. We will need a deeper understanding of how AI works, what benchmarks to use, and what testing is appropriate, and we look forward to developing these perspectives together with other stakeholders.

## Action 13

### Ensure fit-for-purpose regulatory environment for AI

**The Government will continue to maintain a regulatory environment for AI that is pro-innovation while ensuring appropriate guardrails.** We will:

- ▶ **Update AI governance frameworks to address novel risks.** We will regularly review and adjust frameworks like the Model AI Governance Framework and AI Verify to reflect emerging principles, concerns, and technological developments (e.g. Generative AI). As part of this, it will be important to establish clear responsibilities for actors across the AI supply chain. This baseline guidance will give clarity to AI developers and users on how to be responsible in the design and use of AI.

#### Feature Story

### AI Verify

AI Verify is an AI governance testing framework and software toolkit developed by IMDA. The testing framework consists of 11 AI ethics principles which are consistent with internationally recognised frameworks around the world. AI Verify helps organisations validate the performance of their AI systems against these principles through standardised tests. IMDA first released AI Verify in May 2022 for an international pilot.

In June 2023, IMDA also set up the AI Verify Foundation to harness the collective power and contributions of the global open-source community, in developing AI Verify testing tools. The not-for-profit Foundation will boost AI testing capabilities and assurance to meet the needs of companies and regulators globally.



Since its launch in June 2023, the **AI Verify Foundation** has grown to have over 90 corporate members, who work to develop AI testing tools to enable responsible AI.

- ▶ **Continue working with partners on R&D**, particularly around alignment and evaluations. We will work with partners to translate guidelines into appropriate technical standards, tools, and services that can be practically applied. These will also be supported by policy measures including regulatory sandboxes, pilots for solutions such as watermarking and model cards, and capability development to nurture a domestic Testing, Inspection, and Certification (TIC) sector.
- ▶ **Design interventions that are risk-based, tiered, and adapted for specific vertical sectors and horizontal applications.** This recognises that every use case carries a different set of considerations and risks, and would therefore require different risk thresholds and context-specific risk management approaches. For instance, using AI to improve the user experience for video games would differ considerably from a use case where AI assists hiring managers in selecting potential candidates. To ensure coherence with our national position on AI governance, the Government will also establish a common platform for regulatory agencies to coordinate on AI developments in their sectors, and share best practices when governing AI.
- ▶ **Consider updates to broader standards and laws** to support effective AI use.
- ▶ **Contribute actively to international discourse on AI governance**, to raise capacity, share best practices, and shape rules around AI, together with the international community.

#### Feature Story

### UN High-Level Advisory Body on AI

In October 2023, the UN Secretary-General announced the creation of a new multi-stakeholder High-Level Advisory Body (HLAB) on the risks, opportunities, and international governance of AI. The HLAB comprises 39 experts from across UN Member States, and it will support the international community's efforts to govern AI. Dr He Ruimin, the Chief AI Officer and Deputy Chief Digital Technology Officer of the Government of Singapore, has been selected as one of the members of the HLAB.

## Action 14

### Raise security and resilience baseline for AI

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**The Government will also elevate the security and resilience baseline for all system owners using AI.**

- ▶ In the short term, we will **work with partners to update cybersecurity toolkits for enterprises and individual users**, to address AI-related risks. These include advisories and actionable guidelines on how system owners can augment their cybersecurity foundations to enable secure AI adoption.
- ▶ In the longer term, we will also **coordinate efforts to share best practices and ensure alignment to improve AI security**, including through the development of standards and solutions for AI security. This will involve working with the private sector to co-create technical guidelines and solutions to secure AI use cases, and to leverage crowdsourcing initiatives to evaluate risks to AI (e.g. joint red teams to test AI systems). Such close partnerships with the private sector, including on capacity building and public education programmes, will raise baseline AI security capabilities across the ecosystem.

# ENABLER 10

## Leader in Thought and Action



**Today's international AI landscape is contested and fragmented.**

- ▶ **AI has become a major front of competition.** Global powers like the US and China dominate the global AI landscape in research outcomes, innovation capacity, and talent networks. In turn, critical and emerging technologies like AI have become a pre-eminent domain for geostrategic contestation.
- ▶ **While the international community is working to develop consensus around the responsible development and deployment of AI, efforts remain nascent at this point.** All countries recognise the importance of managing AI well, and several have offered ideas on how the international community might cooperate on this. It is still early days, and it will take some time before the international community converges around any set of agreed principles.

Nevertheless, **it remains critical for Singapore to stay engaged internationally, in a multi-party, multi-stakeholder fashion, to work towards a common understanding on AI.**

- ▶ **AI is a technology “without a passport”.** Its impact cannot be easily contained within any single country. It is therefore crucial for all countries to converge on efforts to make AI systems safer, and to avoid AI creating strategic risks and instability. This will require all countries to set aside the instincts of protectionism, to steer AI as a force for good. Singapore is determined to play our part, and we will continue to participate constructively at international fora on AI.
- ▶ **Such conversations on the trajectory of AI must be inclusive.** AI will affect and potentially disrupt all of us. It is therefore important to widen the conversation, beyond the few who are developing cutting-edge models, to take in views from other countries and stakeholders, and build up the capacity for meaningful efforts to address AI’s impact.
- ▶ **Industry also plays a critical role to shape more responsible AI.** We welcome ongoing industry-led efforts, including those by leading AI companies, as valuable contributions to the broader conversation on how to govern AI models better. We look forward to learning together with them.

## Action 15

### Establish Singapore as an ambitious and pragmatic international partner on AI innovation and governance

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**Singapore is committed to being a serious and reliable international partner on AI.** This is important for sustaining our international position as a trusted hub. We will:

- ▶ Continue to grow Singapore's international networks with key partner countries and leading AI companies.
- ▶ Increase international mindshare in practical and risk-based approaches to AI. Singapore has gained global attention because of early efforts to integrate AI in key sectors such as finance, trade, and healthcare, as well as pragmatic Government tools such as Pair. We have developed governance frameworks and open-source testing toolkits such as AI Verify. These demonstrate Singapore's commitment to developing and deploying AI well, and we will leverage these gains to be a global pace-setter at the forefront of AI.

**We will contribute to international AI developments by:**

- ▶ **Anchoring key bilateral relationships with selected partners from government and industry**, through substantive initiatives and technical cooperation. These will allow Singapore to “start small and move quickly”, to establish common ground with like-minded partners, as pathfinders to broad-based multilateral cooperation.
- ▶ **Demonstrating alignment with key international fora and supporting worthwhile platforms**. Singapore will support and actively participate in substantive multilateral, multi-stakeholder, or plurilateral initiatives, that seek to achieve an inclusive, practical, and rules-based global environment for AI.
- ▶ **Sharing Singapore’s experience and curating meaningful partnerships for capacity building**. We will actively profile Singapore’s approaches to AI through public engagements and conferences such as Asia Tech x Singapore and SCAI. We are the convenor of the Forum of Small States (FOSS)<sup>7</sup>, which now has a digital pillar of engagement. Together with government and industry partners, we will develop AI-related capacity building initiatives to benefit the 108 members of FOSS.

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<sup>7</sup> Singapore established FOSS as an informal and non-ideological grouping of small states in 1992, and has served as its Chair since. FOSS now comprises 108 countries across all geographical regions and at all levels of development, and meets several times a year to discuss issues of concern to small states. In 2022, we introduced Digital FOSS as a new pillar of engagement within FOSS.

**Feature Story**

## Asia Tech x Singapore

Asia Tech x Singapore (ATxSG) is a platform to empower the technology community to discuss the latest trends and explore the critical intersections of technology, economy, and society. The third edition of ATxSG, organised by IMDA, was held in June 2023, and brought together over 17,000 global leaders and industry decision-makers across the global technology ecosystem.

A key track of ATxSG is the ATxAI Conference, where thought leaders, industry experts, and policy makers from leading AI countries convene and discuss strategic values of AI governance and technology trends, as well as showcase real-life implementations of AI. 64 speakers and over 2,900 attendees from around the world have participated in ATxAI over the past three years.



**ATxSG** brings together leaders and industry decision-makers across the global technology ecosystem to discuss the latest trends in technologies including AI.



# A Whole-of-Nation Movement

To realise the broad and transformative impact of AI, we will actively forge multiple partnerships across our economy, society, and the world. Singapore's NAIS 2.0 is therefore designed to unfold as a national movement on the global stage.

AI will not only contribute to Singapore's sustained economic growth and the global competitiveness of our industries, it will also create better jobs, a more productive labour force, and substantially improve the quality of life for our people.

Singapore is ready. We welcome all who share our vision of **AI for the Public Good** to join us on the next bound of our AI adventure.

Published 4 December 2023

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### ### Basic Information

- \*\*Country Name:\*\* Singapore
- \*\*Policy Publication Year:\*\* 2023
- \*\*Socio-Economic Context:\*\* Singapore is a high-income, highly developed nation with a robust economy characterized by a strong financial sector, advanced manufacturing, and a growing digital economy. The country has a highly educated workforce, with a strong emphasis on innovation and technology adoption. However, it faces challenges such as an aging population, reliance on foreign talent, and the need for continued economic diversification and productivity enhancements.

- \*\*Policy Type:\*\* National AI Strategy  
(NAIS 2.0)

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### ### 1. Key Objectives and Strategies in the Policy

#### \*\*Primary Goals:\*\*

- To harness AI for the Public Good, both in Singapore and globally.
- To uplift and empower individuals and businesses through AI.
- To address significant societal challenges such as population health and

climate change.

**\*\*Strategies Outlined:\*\***

- **Activity Drivers:** Engage industry, government, and research sectors to leverage AI for meaningful use cases.

- **People & Communities:** Enhance talent capabilities and foster a community centered around AI.

- **Infrastructure & Environment:** Ensure robust infrastructure and a trusted environment for AI innovation.

**\*\*Focus Sectors:\*\***

- Leading economic sectors such as manufacturing, financial services, transport & logistics, and biomedical sciences.

- Smart Nation priorities including healthcare, education, trust & safety, and public service delivery.

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### ### 2. Comparative Analysis with

Socio-Economic Countries

#### #### Similar Socio-Economic Countries

- **Example Country:** South Korea

- **Objectives and Strategies:** Both countries focus on AI-driven innovation across key sectors and emphasize talent development. However, South Korea has a more

aggressive approach in integrating AI into public services and enhancing digital infrastructure.

- \*\*Funding:\*\* South Korea has substantial government funding for AI research and development, similar to Singapore's commitments.

#### ##### Higher-Income Countries

- \*\*Example Country:\*\* United States
  - \*\*Objectives and Strategies:\*\* The U.S. emphasizes ethical AI governance and has established frameworks for AI safety and accountability. While Singapore's approach is more centralized, the U.S. leverages a decentralized model with significant private sector involvement.

- \*\*Funding:\*\* The U.S. allocates substantial funding for AI initiatives, often exceeding that of Singapore, reflecting a larger economy and resource availability.

#### ##### Lower-Income Countries

- \*\*Example Country:\*\* Kenya
  - \*\*Objectives and Strategies:\*\* Kenya focuses on scalable AI solutions in agriculture and healthcare, with community-driven approaches. Unlike

Singapore's extensive infrastructure, Kenya emphasizes resource-efficient models due to budget constraints.

- **Funding:** Funding in Kenya is often sourced from international partnerships and NGOs, contrasting with Singapore's government-led funding.

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### ### 3. Gaps and Areas of Improvement

- **Benchmarking Against OECD Guidelines:** Singapore's policy could benefit from more explicit frameworks on AI ethics, data privacy, and bias mitigation, as outlined by OECD standards.

- **Incorporation of Comparative Insights:** The policy may lack comprehensive strategies for engaging marginalized communities and ensuring equitable access to AI resources, as seen in successful initiatives from countries like Kenya.

- **Ethical and Governance Frameworks:** While Singapore has established frameworks like AI Verify, the policy could further develop mechanisms for continuous monitoring and accountability, as practiced in the U.S.

- **Inclusivity and Workforce**

Development:\*\* The policy should ensure a stronger focus on upskilling the existing workforce, particularly for those in vulnerable job sectors, drawing from successful practices in countries like Germany.

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#### ### 4. Recommendations for Policy

##### Improvement

- \*\*Adopting Best Practices:\*\* Singapore could adopt community-driven AI initiatives from countries like Kenya to enhance local engagement and ensure that AI benefits reach underserved populations.

- \*\*Enhancing Ethical Frameworks:\*\* Strengthen ethical guidelines and data privacy measures by incorporating lessons from the U.S. and EU, ensuring comprehensive governance that builds public trust.

- \*\*Fostering International Cooperation:\*\* Engage in capacity-building initiatives with international partners, leveraging Singapore's strategic location and reputation as a global business hub to enhance collaborative efforts.

- \*\*Resource Allocation and Funding Mechanisms:\*\* Optimize funding strategies by

exploring public-private partnerships similar to those in the U.S., ensuring sustainable investment in AI initiatives.

- **Scalable and Sustainable Approaches:**

Develop scalable solutions inspired by resource-efficient practices in lower-income countries, ensuring that AI adoption is both economically viable and socially responsible.

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### ## 5. Strengths and Innovative Approaches

- **Unique Strategies:** Singapores

proactive approach to establishing AI Centers of Excellence and fostering public-private partnerships is a significant strength, positioning the country as a leader in AI innovation.

- **Forward-Thinking Approaches:** The emphasis on creating a trusted environment for AI development, along with initiatives like AI Verify, showcases Singapore's commitment to ethical AI governance.

- **Community Engagement:** The proposed establishment of a dedicated AI site for creators and practitioners reflects an innovative strategy to nurture collaboration and foster a vibrant AI ecosystem.

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This structured analysis provides a comprehensive overview of Singapore's National AI Strategy 2.0, highlighting its objectives, comparative insights, gaps, recommendations for improvement, and innovative strengths. Engaging stakeholders and ensuring adaptability will be crucial for the successful implementation of the policy and achieving the envisioned outcomes.